ENERGY AUDIT REPORT

of

SHREE L. R. TIWARI DEGREE COLLEGE OF ARTS, COMMERCE AND SCIENCE,

Shree L. R. Tiwari Educational Campus, Mira Road (East) Thane 401 107

PIONEERING EDUCATION
SINCE 1992

Year: 2019-20

Prepared by:

Enrich Consultants

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: enrichcons@gmail.com

ENRICH CONSULTANTS PUNE

REGISTRATION CERTIFICATES

Regn. No. EA-8192 No. 2942

National Productivity Council
(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr. / Ms. Achyut Yashavant Mehendale
son / daughter of Mr. Yashavant
has passed the National Certification Examination for Energy Auditors in April - 2007, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India
Date : 10th August 2007

Controller of Examination

BEE ENERGY AUDITOR CERTIFICATE

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
(A Government of Maharashtra undertaking)
2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,
Ph No: 020-26614393/26614403
Email: eec@mahaurja.com, Web: www.mahaurja.com

ECN/2018-19/CR-05/4174 19th September , 2018

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

We hereby certify that, the firm having following particulars is registered with ***MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)*** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm	:	**Enrich Consultants** Yashashree, Plot No. 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune - 411009.
Registration Category	:	Empanelled *Consultant for Energy Conservation Programme*
Registration Number	:	***MEDA/ECN/CR-05/2018-19/EA-03***

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **31stMarch 2021** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

19/9/18
(Smita Kudarikar)
General Manager (EC)

MEDA EMPANELMENT CERTIFICATE

ENRICH CONSULTANTS PUNE

Enrich Consultants

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/SLRTDC/19-20/01

Date: 17/7/2020

CERTIFICATE

This is to certify that we have conducted Energy Audit at Shree L. R. Tiwari Degree College of Arts, Commerce and Science, Shree L. R. Tiwari Educational Campus, Mira Road (East) Thane 401 107, in the Academic year 2019-20.

.The College has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting

We appreciate the support of Management, involvement of faculty members and students in the process of making the Campus Energy Efficient.

For Enrich Consultants,

A Y Mehendale,
Certified Energy Auditor
EA-8192

ENRICH CONSULTANTS PUNE

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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Shree L. R. Tiwari Degree College of Arts, Commerce and Science, Shree L. R. Tiwari Educational Campus, Mira Road (East) Thane 401 107, for awarding us the assignment of Energy Audit of their Campus for the Year: 2019-20.

We are thankful to all Staff members for helping us during the field study.

EXECUTIVE SUMMARY

1. Shree L. R. Tiwari Degree College of Arts, Commerce and Science), Mira Road, consumes Energy in the form of **Electrical Energy;** used for various Electrical Equipment.

2. Present Energy Consumption& CO_2 Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO_2 Emissions, MT
1	Total	33512	30.16
2	Maximum	3963	3.57
3	Minimum	995	0.90
4	Average	2792.67	2.51

3. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Maximum Usage of Day Lighting

4. Usage of Alternate Energy:

- The College has yet to install Roof Top Solar PV Plant.

5. Usage of LED Lighting:

- The Total LED Lighting Load of the College is **2.552 kW.**
- The Total Lighting Demand of the College is **2.552 kW.**
- The percentage of LED Lighting to Total Lighting Load is **100 %.**

6. Assumptions:

1. Energy Consumption is computed based on Load Utilization Factor
2. **1 kWh** of Electrical Energy releases **0.9 Kg** of CO_2 into atmosphere

7. Reference:

- For CO_2 Emissions: www.tatapower.com

ABBREVIATIONS

LED	:	Light Emitting Diode
BEE	:	Bureau of Energy Efficiency
FTL	:	Fluorescent Tube Light
CFL	:	Compact Fluorescent Light
PV	:	Photo Voltaic
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
CO_2	:	Carbon Di Oxide
MT	:	Metric Ton

CHAPTER-I
INTRODUCTION

1.1 Objectives:

1. To study Connected Load of the College.
2. To study Present Energy Consumption
3. To Study the present CO_2 emissions
4. To study usage of Renewable Energy
5. To study usage of LED Lighting

1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of College	Shree L. R. Tiwari Degree College of Arts, Commerce and Science
2	Address	Shree L. R. Tiwari Educational Campus, Mira Road (East) Thane 401 107
3	Affiliation	University of Mumbai

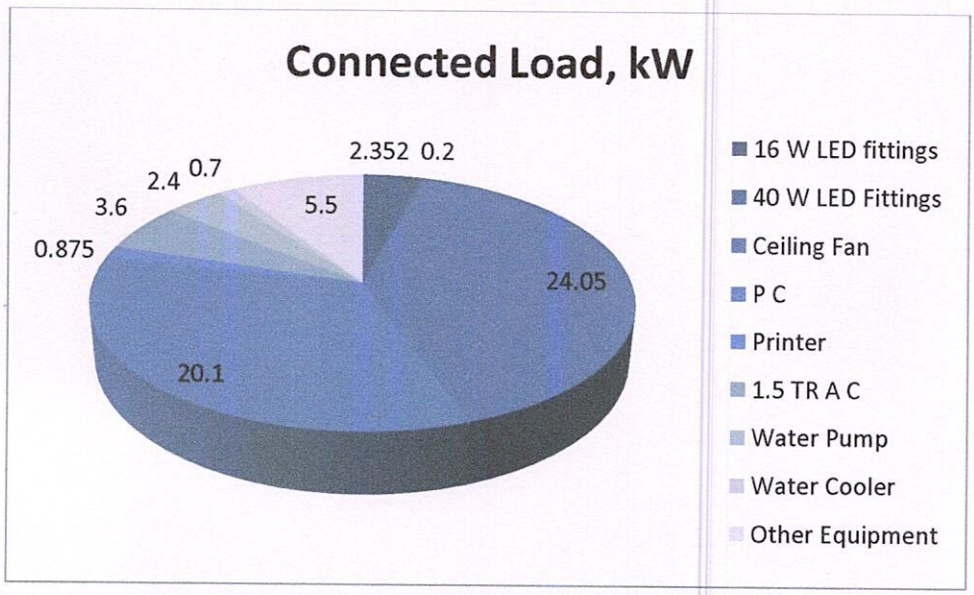
CHAPTER-II
STUDY OF CONNECTED LOAD

The major contributors to the connected load of the College include:

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/unit	Load, kW
1	16 W LED fittings	147	16	2.352
2	40 W LED Fittings	5	40	0.2
3	Ceiling Fan	370	65	24.05
4	P C	134	150	20.1
5	Printer	5	175	0.875
6	1.5 TR A C	2	1800	3.6
7	Water Pump	1	2400	2.4
8	Water Cooler	2	350	0.7
9	Other Equipment	22	250	5.5
10	**Total**			**59.78**

Chart No 1: Study of Connected Load:



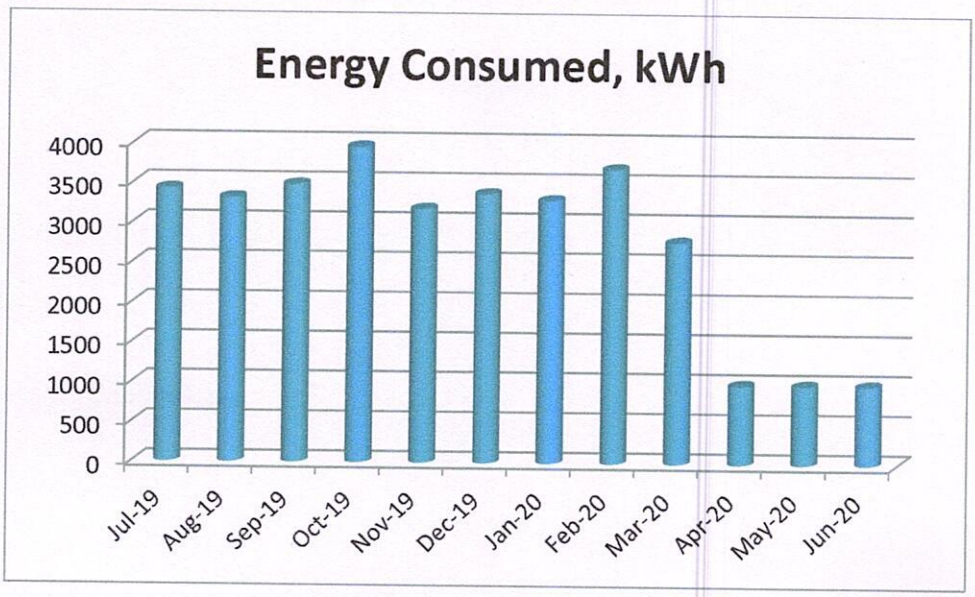
CHAPTER-III
STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electrical Energy Consumption

Table No 3: Electrical Energy Consumption Analysis- 2019-20:

No	Month	Energy Consumed, kWh
1	Jul-19	3425
2	Aug-19	3314
3	Sep-19	3485
4	Oct-19	3963
5	Nov-19	3185
6	Dec-19	3378
7	Jan-20	3298
8	Feb-20	3698
9	Mar-20	2781
10	Apr-20	995
11	May-20	995
12	Jun-20	995
13	Total	33512
14	Maximum	3963
15	Minimum	995
16	Average	2792.67

Chart No 2: Variation in Monthly Energy Consumption:



CHAPTER-IV
CARBON FOOT PRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

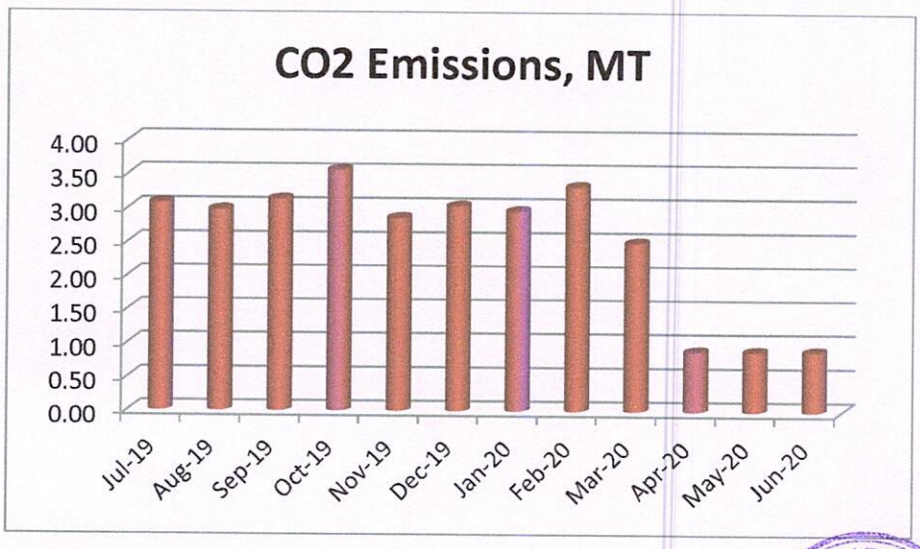
Basis for computation of CO_2 Emissions:

- 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Table No 4: Month wise CO_2 Emissions:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Jul-19	3425	3.08
2	Aug-19	3314	2.98
3	Sep-19	3485	3.14
4	Oct-19	3963	3.57
5	Nov-19	3185	2.87
6	Dec-19	3378	3.04
7	Jan-20	3298	2.97
8	Feb-20	3698	3.33
9	Mar-20	2781	2.50
10	Apr-20	995	0.90
11	May-20	995	0.90
12	Jun-20	995	0.90
13	Total	33512	30.16
14	Maximum	3963	3.57
15	Minimum	995	0.90
16	Average	2792.67	2.51

Chart No 3: Month wise CO_2Emissions:



CHAPTER-V
STUDY OF USAGE OF ALTERNATE ENERGY

The College has yet to install Solar PV Plant

CHAPTER VI
STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LEDs to Total Lighting Load.

Table No 5: Percentage of Usage of LED Lighting to Total Lighting Load:

No	Particulars	Value	Unit
1	No of 16 W LED Fittings	147	Nos
2	Load of 16 W LED Fittings	16	W/unit
3	Total Load of 16 W LED Fittings	**2.352**	kW
4	No of 40 W LED Fittings	5	Nos
5	Load of 40 W LED Fittings	40	W/unit
6	Total Load of 40 W LED Fittings	**0.2**	kW
7	Total LED Lighting Load= 3+6	**2.552**	kW
8	Total Lighting Load= 3+6	**2.552**	kW
9	% of LEDs to Total Lighting Load =**7*100/8**	**100**	%